

Rejections under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1, 4, 5, 29, 32, 33, 43, 45, 46, 48, 79, 83 and 86 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,928,840, issued to Nurczyk, taken in combination with European Patent No. 0 248 380 issued to Heckenbach, U.S. Patent No. 5,251,124, issued to Matsunaga, and U.S. Patent No. 5,156,013, issued to Arima, et al.

Applicants respectfully submit that neither Nurczyk, Heckenbach, Matsunaga, nor Arima teach, suggest, or make obvious the combination of a fuzzy logic controller, such as that disclosed in Matsunaga or Arima, with a Variable Air Volume terminal, as disclosed in Nurczyk, and the plural pressure sensors of Heckenbach. Absent such suggestion, there would be no reason why one skilled in the art, faced with Applicants' problem of creating a simpler and more effectively operable Variable Air Volume ("VAV") terminal controller and VAV system, and having no prior knowledge of Applicants' claimed structure, would consult the combination of references suggested by the Examiner.

Applicants respectfully point out that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, unless there is some teaching or suggestion in the references that the combination be made. In re Stencel, 828 F.2d 751, 755, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987). "Before the PTO may combine the disclosures of two or more prior art references in order to establish prima facie obviousness, there must be some suggestion for doing so." In re Jones, 21 U.S.P.Q.2d 1941, 1943-44 (Fed.

Cir. 1991). "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." In re Lakowski, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989).

Matsunaga discloses a fuzzy logic controller meant to improve fuzzy logic control of an object in a steady-state mode of operation, but does not teach or suggest the use of such a controller for a VAV system. Matsunaga, in fact, discloses an improved fuzzy logic controller, but does not disclose or suggest a particular use for such a controller. Similarly, Arima teaches the use of a fuzzy logic controller, but only for use with an absorption refrigerator. Applicants respectfully submit that it is not obvious or conventional to use a fuzzy logic controller, such as disclosed in Matsunaga or Arima, in a VAV system to implement a comparison of a setpoint and a measured variable to generate a control signal, such as a damper control signal. At least in the case of VAV systems, PID control algorithms are the prior art and it is not obvious to combine the above references to apply fuzzy logic control algorithms to VAV systems. One skilled in the art of VAV systems and their associated control methods would therefore not be likely to use either Matsunaga or Arima, alone or in combination with any other reference, including Nurczyk or Heckenbach, to attempt to solve the problem solved by Applicants.

Applicants respectfully submit that for the reasons given above Claims 1, 29, 43, and 46 meet the requirements of § 103(a). Claims 4 and 5 depend from Claim 1 and contain, by virtue of their dependency, all of the limitations of Claim 1.

Claims 32 and 33 depend from Claim 29, and contain, by virtue of their dependency, all the limitations of Claim 29. Claim 45, 79, and 83 depend from Claim 43, and contain, by virtue of their dependency, all the limitations of Claim 43. Claims 48 and 86 depend from Claim 46, and contain, by virtue of their dependency, all the limitations of Claim 46. As such, claims 4, 5, 32, 33, 45, 48, 79, 83 and 86 are patentably distinct as further limitations upon an allowable independent claim and are allowable for at least the same reasons as the claims from which they depend. Accordingly, Applicants respectfully submit that Claims 4, 5, 32, 33, 45, 48, 79, 83 and 86 also meet the requirements of § 103(a). Applicants therefore respectfully request the Examiner to reconsider and withdraw the rejections and allow Claims 1, 4, 5, 29, 32, 33, 43, 45, 46, 48, 79, 83 and 86.

The Examiner rejected Claims 8 and 36 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,928,840, issued to Nurczyk, in view of European Patent No. 0 248 380 issued to Heckenbach, U.S. Patent No. 5,251,124, issued to Matsunaga, and U.S. Patent No. 5,156,013, issued to Arima, et al, and further in view of U.S. Patent No. 4,969,508, issued to Tate, et al, which, according to the Examiner, shows remote control of a VAV terminal.

Applicants respectfully submit that Claim 8 depends from Claim 1, and contains, by virtue of its dependency, all the limitations of Claim 1. Claim 36 depends from Claim 29, and contains, by virtue of its dependency, all the limitations of Claim 29. Because, as discussed above, Claims 1 and 29 meet the requirements of § 103(a), Applicants respectfully submit that Claims 8 and 36 also meet the requirements of § 103(a) as

further limitations upon an allowable base claim and are allowable for at least the same reasons as the claims from which they depend. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the rejections and allow Claims 8 and 36.

Rejections under 35 U.S.C. § 112

The Examiner rejected Claims 80, 85, and 87 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Examiner states that "The original disclosure does not support fuzzy logic control of a liquid valve, claims 80 and 87[,] or the shield of claim 85."

Applicants submit that Claims 80, 85 and 87 are supported by the specification of the original case as filed. The original specification teaches a controller that can be used to control a VAV terminal. As part of controlling a VAV terminal that could be part of a VAV air conditioning system, or other environmental management system, the controller disclosed in the present Application can also control an auxiliary fan, first and second heaters, and a hot water coil flow control valve (page 13, lines 18-20, page 15, lines 4-7, and, in particular, page 20, lines 3-17 (control of flow through heating coils)).

The control scheme disclosed in Applicants' present Application is intended ultimately to be used to control an air medium. However, to control the air medium, the control

scheme also can be used to control alternative mediums, such as hot water in a coil, that directly affect the air medium. Even further, the ability to control an additional medium other than air, which in turn directly affects the air medium, is contemplated and supported by the specification.

In a VAV terminal controller embodiment, the controller disclosed by Applicants' can be used to control the temperatures in different parts of an environment by modulating the flow of air having a constant temperature. Further, controlling the flow of air includes the ability to maintain the desired air temperature to begin with. Controlling the temperature of the air by, for example, controlling the valve that controls the flow of hot water to a heating coil, is therefore not only within the scope of Applicants' invention as disclosed, but clearly an important feature of an embodiment of Applicants' invention.

Claim 85 is also supported by the specification of the original case as filed. The use of a heat sink to protect the flow sensing circuitry from temperature effects is clearly to use a shield, as recited in Claim 85, and is supported by the specification at page 47, line 16-page 48, line 7. However, in an effort to advance prosecution of this case, Applicants have amended Claim 85 to recite the limitation of a "heat sink" surrounding the flow sensing circuitry.

For the reasons given above, Applicants respectfully request the Examiner withdraw the rejections and allow Claims 80, 85, and 87.

Nonstatutory Double Patenting Rejection

The Examiner rejected Claim 1 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 49 of copending Application No. 08/932,652 in view of Official Notice.

The Examiner stated that "Official Notice is taken that it is well known to provide a damper position sensor that shuts down the damper when it reaches certain positions such a fully open or minimum ventilating position. In order to provide the above two functions it would have been obvious to so modify Claim 1." As stated in MPEP §2144.03, "[w]hen a rejection is based on facts within the personal knowledge of the examiner, the data should be stated as specifically as possible and the facts must be supported, when called for the by the applicant." Applicants therefore respectfully request that the Examiner provide a supporting affidavit under 37 C.F.R. §1.104(d)(2).

Consent Objection

The Examiner has objected to the present Application under 37 CFR1.172(a) as lacking the written consent of all assignees owning an undivided interest in the patent. Applicants respectfully submit that Title in the name of EMS Control Systems International was recorded on July 21, 1994, Reel 7100, Frame 0805 and that Bill Bartles, Director of CSI Pacific, formerly EMS Control Systems International, had, in the parent application, already assented to reissue of Original Patent Number 5,450,999. However to further

prosecution of the present application, Applicants will submit a copy of a newly executed consent under separate cover.

Objected to Claims

The Examiner objected to Claims 3, 31, 44, 47, and 81 as being dependent upon a rejected base Claim, but that would be allowable if rewritten in independent form including all of the limitations of the base Claim and any intervening Claims. Claim 3 depends from Claim 1, Claim 31 depends from Claim 29, Claims 44 and 81 depend from Claim 43, and Claim 47 depends from Claim 46. For the reasons provided above, Claims 1, 29, 43, and 46 are allowable Claims, and thus Claims 3, 31, 44, 47 and 81 are patentably distinct and allowable as further limitations upon an allowable base Claim. Applicants therefore request that Examiner withdraw his objection and allow Claims 3, 31, 44, 47, and 81.

Other Matters

Examiner states that Claim 15 is not identical to patent claim 15 and therefore the newly added matter "Operating said variable air volume terminal in a warm up mode of operation" must be underlined. Applicants have rewritten Claim 15, with the indicated matter underlined and the claim noted as amended, in response to Examiner's comment.

The Examiner notes that newly added Claims 79-87 are misnumbered and should be re-numbered as 64-72 before allowance. Applicants hereby authorize the Examiner to re-number the claims in question per the Examiner's determination of the correct numbering sequence before allowance.

The Examiner suggests that it is advisable, but not

required, for Applicants to present a Declaration that specifically points out the amendment to Claim 15 and the fact that new Claims 79-87 have been added. As it is not required, Applicants elect not to submit such a Declaration at this time.

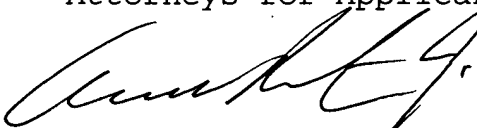
CONCLUSION

Applicants appreciate the Examiner's efforts to review this case. Applicants have made an earnest attempt to place this case in condition for allowance and request continued examination and allowance of the Application. For the foregoing reasons and for other reasons clearly apparent, Applicants respectfully request full allowance of Claims 1, 3-5, 8, 15, 17-19, 22, 29, 31-33, 36, 43-48, and 70-78.

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich, LLP.

Respectfully submitted,

GRAY CARY WARE ▲ FREIDENRICH LLP
Attorneys for Applicants



Armando Pastrana, Jr.
Reg. No. 44,997

Dated: July 2, 2001
1221 S. MoPac Expressway
Suite 400
Austin, TX 78746
(512) 457-7080
(512) 457-7001 (facsimile)



APPENDIX I

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15. (ONCE AMENDED) A method for controlling a variable air volume terminal, having a damper and a damper motor, comprising the steps of:

generating a temperature process value using temperature sensing circuitry;

establishing a temperature setpoint using setpoint determining circuitry;

generating an airflow setpoint in response to said temperature process value and said temperature setpoint using airflow signal circuitry;

operating said variable air volume terminal in a warm-up mode of operation;

generating a flow process value in response to a predetermined set of flow sensing inputs using flow sensing circuitry; and

generating a damper motor operation signal using damper control circuitry to control the damper motor in response to said flow process value and said airflow setpoint, said damper motor operation signal generating step further comprising the step of implementing a set of fuzzy logic rule-based instructions in generating said damper motor operating signal.

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